

ISE241: Wireless Digital Communications

Credit Hours: 4

Prerequisites: ISE103

Course Description

Students taking this course will obtain the conceptual knowledge and hands-on skills needed to work with wireless technology in a network administration environment. Students will learn fundamental topics, such as planning, designing, installing, securing, and configuring wireless LANs and common wireless LAN uses including maintenance, security, and business applications. This course is designed around the latest version of the CWNA exam, as well as the new IEEE 802.11 standards.

Instructor Contact Information

Instructor Name	Gerard Arthus
Instructor Email	Garthus801@gmail.com
Instructor Phone	Home 574-217-8726 Cell 631-335-5250

Course Length

The college evaluates each course in terms of quarter hours of credit. One unit of credit is usually equivalent to a minimum of ten academic instruction hours of lecture and examination, twenty hours of skill development, or thirty hours of externship, or a combination of the three. An academic instructional hour is fifty minutes.

This class will meet for the equivalent of a minimum of 55 instructional hours or as otherwise scheduled by the college and at least in conformance with this minimum and the Syllabus. As specified by the Method of Instruction section of this Outline, the instructor will ensure that the total class sessions presented consist of a minimum of 27.5 direct faculty instruction hours and a maximum of 27.5 appropriate classroom activity hours.

All course offerings require outside preparation time, which is approximately two hours per lecture instructional hour and/or one hour per skill development instructional hour, depending on the background, interest, abilities, and motivation of the individual student.

Course Objectives

By the end of this course, you should be able to:

1. List the four types of wireless networks and explain the advantages and disadvantages of each.
2. Discuss different wireless data applications.
3. Explain the need for and sources of wireless networking standards; explain the roles of the different standards organizations.
4. Describe the features of the IEEE 802.11a/b/g/n WLANs
5. List the different types of client hardware and software and describe the different functions of infrastructure devices.
6. Explain the basic principles of radio frequency transmissions and describe the different types of analog and digital modulation.
7. Understand the units of measurement for radio frequency transmissions and describe how radio frequency waves behave and the impact of these behaviors on transmissions.
8. List the types of antennas and the different concepts that relate to antennas.
9. Describe antenna coverage patterns and list the different antenna measurements.
10. Explain MIMO.

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11. Explain the features in the 802.11 Physical Layer Standards and describe how these standards are different from other standards.
12. Describe the technologies found in the 802.11 PHY standards.
13. Understand Media Access Control Layer standards.
14. Describe the features of autonomous access point architecture; explain the characteristics and features of a controller-based architecture.
15. Explain what a wireless network management system is and how it functions.
16. Describe the characteristics of basic and enhanced power management technologies.
17. Explain how to conduct a site survey and describe the tools used for conducting a site survey.
18. Understand the principles that define information security; explain the vulnerabilities of wireless transmissions.
19. Describe different types of wireless attacks and discuss legacy IEEE security protections.
20. Describe traditional wireless security solutions; describe the encryption and authentication features of IEEE 802.11/WPA2 and the features of wireless intrusion detection and prevention systems.
21. Explain how to maintain and manage a WLAN; list the tools used for monitoring wireless networks.
22. Describe the procedures for troubleshooting RF interference, WLAN configuration and wireless devices.
23. Describe the procedures for optimizing a WLAN.

Gradebook

A student's performance in this course will be evaluated using a variety of factors listed below. Instructors must use a minimum of three (**homework, tests and a final exam are required**), and it is recommended that instructors use all five of the areas in your evaluation.

The exact weight to be given to any particular area is determined by the instructor and will normally fall within the ranges listed below.

Area	Percentage for this Course	Suggested Range
Final Exam	25%	20 – 25%
Tests	30%	20 – 40%
Homework	15%	10 – 15%
Project/Research Paper	20%	20 – 25%
Class Participation	10%	10 – 15%
TOTAL	100%	

Letter Grade	Points	Explanation
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A	94-100	Excellent
B	84-93	Above Average
C	74-83	Average
D	64-73	Below Average
F	63 & Below	Failure

Textbook & Instructional Material

CWNA Guide to Wireless LANs, 3rd Edition, Mark Ciampa, Cengage Learning, 2013.

Teaching tools are available from the vendor on a CD ROM that includes a test bank and instructor's manual. These are also available online.

The instructor might utilize additional instructional materials as provided by the publisher.

Course Outline

Term:147

Class Date: <u>Week 1: 09 July 2014</u> Chapter 1: <i>The World of Wireless</i>	Homework Due Date: <u>By the end of the next week</u>
In Class Activities <u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	Homework <u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>
Class Date: <u>Week 2: 16 July 2014</u> Chapter 2: <i>Wireless Local Area Networks</i>	Homework Due Date: <u>By the end of the next week</u>
In Class Activities	Homework

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<p><u>Do all of the Hands-on Labs in this week's chapters.</u></p> <p><u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u></p> <p><u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u></p>	<p><u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u></p>
<p>Class Date: <u>Week 3: 23 July 2014</u> Chapter 3: <i>Radio Frequency Fundamentals</i></p>	<p>Homework Due Date: <u>By the end of the next week</u></p>
<p>In Class Activities</p>	<p>Homework</p>
<p><u>Do all of the Hands-on Labs in this week's chapters.</u></p> <p><u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u></p> <p><u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u></p>	<p><u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u></p>
<p>Class Date: <u>Week 4: 30 July 2014</u> Chapter 4: <i>Antennas</i></p>	<p>Homework Due Date: <u>By the end of the next week</u></p>

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<p>In Class Activities</p> <p><u>Do all of the Hands-on Labs in this week's chapters.</u></p> <p><u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u></p> <p><u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u></p>	<p>Homework</p> <p><u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u></p>
<p>Class Date: Week 5: 06 August 2014</p> <p>Chapter 5: <i>Physical Layer Standards</i></p>	<p>Homework Due Date: By the end of the next week</p>
<p>In Class Activities</p> <p><u>Do all of the Hands-on Labs in this week's chapters.</u></p> <p><u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u></p> <p><u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u></p>	<p>Homework</p> <p><u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u></p>
<p>Class Date: Week 6: 13 August 2014</p>	<p>Homework Due Date: By the end of the next</p>

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Chapter 6: Media Access Control Layer Standards	week
<p>In Class Activities</p> <p><u>Do all of the Hands-on Labs in this week's chapters.</u></p> <p><u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u></p> <p><u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u></p>	<p>Homework</p> <p><u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u></p>
<p>Class Date: Week 7: 20 August 2014 Chapter 7: WLAN Management and Architectures</p>	<p>Homework Due Date: By the end of the next week</p>
<p>In Class Activities</p> <p><u>Do all of the Hands-on Labs in this week's chapters.</u></p> <p><u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u></p> <p><u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u></p>	<p>Homework</p> <p><u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u></p>

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Class Date: <u>Week 7: 20 August 2014</u> Chapter 8: <i>Conducting a Site Survey</i>	Homework Due Date: <u>By the end of the next week</u>
In Class Activities <u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	Homework <u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>
Class Date: <u>Week 8: 27 August 2014</u> Chapter 9: <i>Wireless LAN Security Vulnerabilities</i>	Homework Due Date: <u>By the end of the next week</u>
In Class Activities <u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	Homework <u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>

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Class Date: <u>Week 8: 27 August 2014</u> Chapter 10: <i>Implementing Wireless LAN Security</i>	Homework Due Date: <u>By the end of the next week</u>
In Class Activities <u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	Homework <u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>
Class Date: <u>Week 9: 03 September 2014</u> Chapter 11: <i>Managing a Wireless LAN</i>	Homework Due Date: <u>By the end of the next week</u>
In Class Activities <u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	Homework <u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>

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Class Date: <u>Week 9: 03 September 2014</u> Chapter 12: <i>Wireless Network Troubleshooting and Optimization</i>	Homework Due Date: <u>By the end of the next week</u> ____
In Class Activities	Homework
<u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	<u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>
Class Date: <u>Week 9: 03 September 2014</u> Chapter 13: <i>Other Wireless Networks</i>	Homework Due Date: <u>By the end of the next week</u> ____
In Class Activities	Homework
<u>Do all of the Hands-on Labs in this week's chapters.</u> <u>Do the quiz and the discussion forum posted on the Course Web-site for this week.</u> <u>Document and record all work with appropriate screenshots (Using Greenshot screen-capture software; or the Snagit feature in Windows 7) and clear, concise, and understandable wording. Complete these assignments in a tutorial type format as if you were explaining the materials to someone who was unfamiliar with the information.</u>	<u>Do Homework for this week as listed on the Course Web-site for each Chapter in the Assigned Textbook.</u>

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This course has an in-class final exam. Final exam date: 11 September 2014

Additional Final Exam Information:

Method of Instruction

Instructional techniques must be appropriate, and at a collegiate level, to the specific goals and objectives cited above. Students and instructors must have a clear understanding of the goals and time requirements of this course, the nature of the course context, and method of evaluation.

This course has two distinct but related instructional phases. The first component constitutes a minimum of 27.5 direct faculty instruction hours. This component is the lecture series and provides instruction in theory, principles or practices of the course. The second component constitutes a maximum of 27.5 appropriate classroom activity hours. This component is the skill development phase of the course and provides students the opportunity to apply knowledge gained in the lecture series. Method of instruction must fulfill the intended learner outcomes and competencies stated in the course goals and objectives and are appropriate to the capabilities of the students. For career oriented courses, the instructor must demonstrate that an effective relationship exists between curricular content and current practices in the field.

Additional Class Notes

Go to <http://www.openeducation.org/moodle> to use the Web-Assisted site for this course. Quizzes and discussion forums will be completed on-line at this site. This site will have a detailed explanation of all of the course requirements, materials, readings, videos.